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The latest New York quotation for 96 test was 4½c., which will be the rate for some time, as the European beet crop is being harvested, and will prevent any material advance, by rival refineries.

Messrs. Willett & Gray estimate the American beet crop for the current year at 86,000 tons of sugar. Last year's crop was 72,944 tons. The weather has not been favorable this year for the beets, and the above estimate may be reduced.

THE NEW YORK SUGAR WAR RESUMED.—For some months the position in the market of that prominent speculative security, American Sugar Refining Company stock, has been mainly determined by the prevalence of a belief that the competitive warfare among sugar-refining interests was a thing of the past. The fact that demands for sugar during the spring and summer were very large, and that the increased production of the refined article was readily absorbed, was, of course, a factor in the situation. Prices for sugar advanced to a level which, with the refineries running to their full capacity, assured good profits. This week, however, has brought developments which show that the alleged settlement of the sugar-trade war was a mistake. Cutting by the National company and a reduction by the Arbuckles was followed by a cut of 40 points in the price for the principal standard grades by the American Sugar Refining Company. This reduction, which was from 6.15 cents to 5.75 cents for refined, was the heaviest ever made in a single day since the company was formed, and resulted at once by similar action by all parties. To Wall street the inference that the war is on again is a plain one, and, while sugar company stock has been held up by the presence of a large short interest in it, with the buying to cover contracts put out by the bears, it is considered that the stock in question may again execute one of the downward movements for which it is just as famous as for its sudden and remarkable rises.—Bradstreets, Oct. 20.

Willett & Gray of New York, who possess exceptional advantages for this purpose, estimate the American beet crop for 1900 at 86,000 tons of sugar. The crop for 1899 was 72,944 tons. This year's crop has suffered from drought, as the Hawaiian crop was also reduced from the same cause.

Dr. Maxwell, before his departure for Queensland, stated that a forestry expert, from the United States Forestry Department, had been selected for work in Hawaii, and might be expected here before the close of this year. Such a person is greatly needed, and his work ought to receive prompt attention, and if approved, at once carried out. No government forest land should be leased or sold without some restrictions, the violation of which should nullify the sale or lease.

The late Congressman Dingley, when asked the secret of success in Congress, replied: "If a man be a specialist on a subject, if he knows more than the ordinary Congressman knows or can hope to learn by mere dabbling, then he can compel Congress to listen to him, and he rises to be a power." Here is summed up in a few words the secret of success not only in Congress, but in every other branch of life. The man who knows some one subject thoroughly and has the power to impart his knowledge or to apply it practically is the man who is successful. This is the day of the specialist.

We note that several of our exchanges quote the remark made by Dr. Stubbs at the dinner given to him by the merchants of Honolulu: "Don't forget, in your mad ambition to declare the largest dividends, the old maxim, 'Feed your lands and they will feed you.' "—that this might profitably be followed by the majority of growers of agricultural products of America. And one paper adds this incident—that "the most successful raisin grower in California said some years ago that he had discovered that he could not rob God. And so he began the systematic and scientific fertilization of his vineyard, with the result that the weight of raisins produced beat the record of all neighboring vineyards. It pays to be generous to the soil."

The attention of machinists and inventors is called to the report of the Committee on Harvesting Machinery in this issue. The rewards offered may appear small compared to the necessity calling for such inventions; but the successful man is sure to reap a fortune from the invention, if it fills the billet.

When David M. Weston made his first rude centrifugal machine in the flour mill building on the site now occupied by the iron foundry in Honolulu, he probably never dreamed that for fifty years it would provide the best if not the only means of rapidly drying sugar and many other products that still depend on it as the best ever produced. A cane harvester is needed quite as much, and would prove as valuable to its inventor as the centrifugal has been. And it is sure to come ere long, for there are a thousand brains now studying to solve the problem, which all must admit is a very tough one.

The sugar crop of these islands for the year 1900 foots up, as will be seen by the tables, 286,000 short tons, which is less than was expected by some twenty thousand tons. This shortage has been caused by lack of rain during the latter half of the fiscal year. Fortunately, many of the plantations located in rainless belts are supplied in part by artesian or mountain water, brought a long distance in flumes, otherwise the shortage would have been much greater. At the annual meeting the subject of protecting the forests was brought up, and although a few took the ground that forests should give way to farming interests, yet the general sentiment was for preserving the forest belts, by legislative action, forbidding the further destruction of them. It is a question which should receive decisive action without further delay, if the forests are to be protected.

Mr. Wray Taylor, Hawaiian Commissioner of Agriculture and Forestry, has received the following advices from Prof. Stubbs relative to the establishment here of an Experiment Station by the U. S. Government. As will be seen by the following, its location will be near the city, back of Punchbowl.

"My Dear Sir:—We returned from Washington to this point on yesterday. While in Washington I received your kind letter, written on your return from the Island of Oahu.

"I have made my report to the President and Secretary, which will be adopted. That report recommends that the Experiment Station be located on the plat assigned by your former government for the experiment station. The 220 acres, a part of which has been set aside by proclamation of President McKinley, we will try to recover. I have recommended that the director be appointed, which will be done immediately. He will probably be there to take charge before the beginning of next year. He will clear the grounds, erect the buildings,

and get ready for the remainder of his staff, which will follow as soon as he has everything in readiness.

"I have also recommended that Governor Dole, yourself and the Commissioner of Public Lands (Mr. Brown) be an advisory council to the director, the details of which will be attended to in a few weeks. I think in a few months you will have a fully equipped experiment station right at your doors. We are now hunting for a suitable director, which I am sorry to say is no easy matter."

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CORRESPONDENCE WITH DR. MAXWELL.

United States Department of Agriculture, Office of Special Correspondent, Hawaiian Islands.

HONOLULU, October 26, 1900.

MR. H. M. WHITNEY, Editor "Planters' Monthly," Hawaii.

DEAR SIR:—As you are aware, I am just about to close my connection with the sugar industry of these Islands. In doing so, and in taking departure, let me thank you for your aid given to my work through the journal that you edit; and let me also wish you many years of life to devote to the interests and the country which have your best thoughts and affections.

P. S.—Will you be good enough to republish Governor Dole's letter, with this letter to you.

Dear, Mr. Editor, Yours very truly,

WALTER MAXWELL.

GOVERNOR DOLE TO DR. MAXWELL.

HONOLULU, October 26, 1900.

DR. WALTER MAXWELL,
Honolulu, H. I.

MY DEAR SIR:—In view of your prospective departure from Honolulu, I desire to express my appreciation of the scientific work you have accomplished in the Hawaiian Islands, as Director and Chief Chemist of the Hawaiian Experiment Station and Laboratories, under the auspices of the Sugar Planters' Association, and my sincere regret that your stay in this country is about to terminate.

Not only have your investigations been of the greatest importance to the sugar planters, but, I am convinced that they have been of great value to other agricultural interests as well.

The contributions you have made from time to time to the questions of the formation and composition of Hawaiian soils, and to the principles of the fertilization of soils, irrigation,

cultivation of crops, the effect of rainfall on soils, forestry and other kindred subjects have been of great and lasting public benefit to the Hawaiian Islands.

Permit me to thank you for the counsel and assistance which you have so often and so cheerfully rendered the Government in questions within your lines of professional work and also in other matters, especially the valuable assistance you have given as a Commissioner of Public Instruction, to the administration of the public schools.

I wish you all success in your new and larger field.

Very sincerely yours,

SANFORD B. DOLE.

PRESIDENT SCHAEFER TO DR. MAXWELL.

HONOLULU, October 27, 1900.

MY DEAR SIR:—I beg leave on the part of the Hawaiian Sugar Planters' Association to wish you God speed on your way and every success in your new and extended sphere of usefulness to the agricultural interests of Queensland, where you are to fill a responsible and influential position of trust.

I desire to avail of this opportunity to say that the Association sees you depart with sincere regret and gratefully remembers the valuable services rendered by you to the Hawaiian planters during the years you so faithfully and successfully filled the position of Director of its Experiment Station and Laboratories.

I hope and trust that it may be our good fortune to greet you again among us whenever you recross the Pacific eastward bound, and I assure you that the sincere good wishes of your friends in these Islands are ever with you and yours.

With my personal regards, I remain, my dear sir,

Very sincerely yours,

F. A. SCHAEFER,

President of the Hawaiian Sugar Planters' Association.

Dr. Walter Maxwell, Director of the Experimental Station and Laboratories of the Hawaiian Sugar Planters' Association, Honolulu.

PROF. STUBBS' ACCOUNT OF HIS RECENT VISIT TO HAWAII.

In an interview with a New Orleans Times-Democrat reporter, Prof. W. C. Stubbs tells of his recent visit to the Hawaiian Islands, as follows:

In respect of the agricultural interests of the Islands, Prof. Stubbs said that all the lands were originally held by the crown in fee, but soon after the advent of the missionaries the King was induced to divide the land in three equal portions, one-third being given to the chiefs and the remaining third being divided among the peasantry. Under the old system,

which closely resembled the European feudal system, the King divided his estates among the chiefs or nobility, who leased them to the peasants in such tracts as they could cultivate. When the land was divided the holdings were entered in the Mahele Book, the "Doomsday" book of Hawaii. This Mahele book is, of course, the foundation of all titles to real estate in the islands.

"On the islands there are about sixty plantations," said the Professor, "only four of the islands—Kauai, Hawaii, Maui and Oahu being devoted to the cultivation of sugar cane principally. The others are devoted to the raising of live stock and the cultivation of rice. Molokai is volcanic, and sugar culture is prevented by the lack of water. On the islands where sugar cannot profitably be grown there are numerous coffee plantations, the high, mountainous lands being used for stock farms. Moisture is very unevenly distributed on the islands. On the windward side there is a sufficiency of rainfall, while on the leeward side there is no rainfall, and artesian water has to be used for irrigation.

"The soil on the arid or leeward side of the islands is the richer for the sufficient reason that the earth has not been leached by the rain, and has consequently retained all of its virgin fertility. On the west side of the islands the yield of sugar is from six to nine tons per acre, while on the irrigated lands on the arid side the yield is from eight to fifteen tons. This yield, however, is not annual, the cane requiring two years in which to mature. The cost of irrigation is great, the installation of plants costly, and coal is worth from $7 to $12 per ton. All of the sugar houses on the islands are modern and up to the requirements of the day. On the plantations where irrigation is practiced steam plows are used, and the soil is broken to a depth of three feet, the planting being very deep.

"The culture of sugar cane occupies about all the available land of the islands, lack of water and labor having been the two obstacles in the way of extension. While some of the plantations may yet be slightly enlarged, no new plantations can be taken up, and the present sugar acreage of the islands may be accepted as their ultimate capacity. There are no sugar planters in the Hawaiian Islands as the term 'planter' is understood here. The plantations are owned by stock companies, and are operated by a general agent, who employs the labor, cultivates the crop, disposes of the product, and makes an annual report to the stockholders. The stock of these plantations is sold daily at the mart at Honolulu, pretty much as railroad shares are sold in this country.

"The soil between the sugar plantations and the coast is cultivated by Chinamen, who, as one would suppose, devote their labor to the raising of rice. They cultivate the cereal after the most primitive methods. The Chinese rice grower

turns up the soil while it is flooded with a plow that should be in a museum, and does the harvesting and winnowing by hand. Notwithstanding his 'previous' methods, however, the Chinaman is able to pay $50 per acre rent for his holding. He raises two crops a year, the first paying the annual rent, while the second crop is the Chinaman's own.

"Beyond the sugar plantations and some 4,000 or 5,000 feet up the mountain is grown coffee. This coffee is extremely popular on the Pacific coast, where it meets ready sale at a satisfactory price. Above the sugar plantations are the cattle ranches. These ranches have become a matter of great insular importance, it being generally believed that they are responsible for the destruction of the forests, which are gradually disappearing, and cutting off the rainfall.

"The secondary crops of the islands are pineapples and bananas, both of which fruits are raised in sufficient quantities to export. A sort of mayapple, alligator pears, breadfruit and other fruits are also grown in gardens for family consumption. The natives cultivate the taro plant, which supplies their principal food, and from which the national dish, 'poi,' is made. Taro, poi and fish supply about all the food consumed by the natives.

"As has been stated, the great desideratum of the islands is more water. The absence of moisture is felt even on the windward side of the islands, where the rainfall is annually from 20 to 300 inches. This is due to the fact that the soil is porous and drinks up the water as fast as it falls. In consequence there is no storage of water in streams and ponds as in most countries. There is, moreover, no dew, and cattle have to adapt themselves to this unusual condition by eating, instead of drinking water. In the early morning after a rain they go out and crop the grass, the blades of which have retained some of the precious fluid. Island raised cattle understand the situation perfectly and give no trouble, but most of the imported stock cannot adapt themselves to their changed conditions."

The climate of the islands, said Prof. Stubbs, was delightful. The thermometer never got above 85 degrees and did not go below 60. There were no seasons. Vegetation grew the year around, and fruit trees very often bore the ripened fruit and the blossom at the same time. The island entomologist had noticed one of the fruits grown in the island bearing ripe fruit in May. Some time after he desired to secure some of the seed of this fruit for planting and naturally concluded that May was the proper time to collect the seed; but when he went to the tree the next May he found that he was about two months too late. The tree had budded and was full of green fruit. Some of the more progressive horticulturists have taken advantage of this lack of seasons to have fresh fruits the year around. Particularly can this be done with grapes.

By careful irrigation a vine can be made to bear at any time the gardener desires, and the Portuguese gardeners have fresh grapes in the Honolulu market every day in the year.

"There are in the islands now two or three settlements of American farmers," Prof. Stubbs continued, "who are trying to cultivate vegetables for the home markets. But the attempt will probably be abandoned as previous attempts have been. When the farmer has prepared his land for any other crop it dawns upon him that there is more money to be made by raising sugar cane. It is extremely improbable that there will ever be any diversity in farming in Hawaii, for the cultivation of sugar eats up everything else. The price of sugar will have to fall far below the present price before other crops can be raised on suitable lands in the islands. At present the Chinamen raise vegetables in a small way, but not enough to supply the home markets.

"The islands are surrounded by coral reefs. Boats cannot approach the shore. Sugar and other articles of export have to be transported to ships on wire cables stretched from the shore. Traffic between the islands is carried on crudely, and as the business is a monopoly, the tariff of rates is almost prohibitive."

First class sugar lands in the islands are very valuable. They lease at high figures. Prof. Stubbs attempted to buy lands near Honolulu for the Government Experiment Station, but he found that lands within five miles of the city were held at from $2,500 to $3,000 per acre.

The native islanders have little or nothing to do with the cultivation of the soil. They are principally engaged in loading ships. Being fine boatmen, they do most of the handling of small boats. They are also very fond of horses, and are engaged in the class of work in which horses are used. The native is lazy, fond of music and flowers, and is an exceptionally harmless and peaceful person. Reared on an island, in which there has never been any game, remote from any people who might be hostile, the Hawaiian has never in all his history known the use of weapons. He is consequently rarely, if ever, guilty of crimes against the person. His love of flowers amounts to a passion. He habitually wears a lei or garland of flowers about his neck or around his hat, and these garlands are sold on stands on the street just as boutonnieres are sold in the cities of this country.

Chinese labor is esteemed the best on the island. The Chinaman is universally employed for domestic service, and in the cultivation of the soil, which his services can be had. He is regarded as being honest and trustworthy in all respects, and is almost as peaceable and tractable as the native. It is noteworthy fact that a Honolulu banker will lend money to a Chinaman on his simple note of hand, where an American will be refused. The irrigation of sugar lands is done by the "Chinks" at so much per tons of the cane produced.

The Japanese are not so much in favor as laborers or employees, nor so neat as Chinamen; are disposed to go on strike, and are belligerent and self assertive, and are principally engaged in the cultivation of coffee. The Portuguese, who intermarry with the natives, are usually engaged in the cultivation of grapes and small fruits. As a "general proposition" the natives do nothing.

The native is gradually becoming extinct as a result of civilization, being peculiarly susceptible to the diseases that foreigners have introduced in the islands. Besides, the birth rate is very long. No King or Queen of the islands has had a child in 100 years. The throne has gone to collateral branches of the royal family, which is now reduced to the late Queen, Prince David and the niece of the Queen, who was to have succeeded to the throne, had the throne not ceased to exist.

One of the most interesting features of the island to the visitor is the Kamehameha Training School, established and endowed by a native. One of the native princesses married an American named Charles R. Bishop. She was a woman of great wealth, and having no children, established the school for the children of native, or partially native blood, and at her death endowed it with a sum that produces an income of about $200,000. Mr. Bishop, following his wife's beneficence, afterward dedicated a large sum to the establishment of the Polynesian Museum, which is one of the most interesting institutions of the kind in the world. In its way it is the equal of the Smithsonian Institution at Washington.

Being unable to secure any land by purchase for what he considered a reasonable sum, Prof. Stubbs finally located a piece of Government land which has been set aside for the use of the Station. The land is unimproved, and the Station will have to be constructed from the ground up. A director of the Station will soon be appointed, and by January 1 will arrive on the ground and begin the erection of the necessary buildings, secure the machinery, etc. As the sugar planters have already a well equipped sugar experiment station in operation, the new station will not have to do with sugar culture, but will experiment with other crops. As soon as the buildings are completed the director will secure the services of a chemist, a bacteriologist, a horticulturist, a farm manager and a dairyman, and the station should be in full blast by next April.

Mr. Maxwell, who left this city to take charge of the Hawaiian Sugar Planters' Experiment Station, which has been of material aid in bringing the production of sugar in the islands to a state of perfection, having resigned to accept a position in Queensland, Mr. Blouin, one of Prof. Stubbs' assistants, has been selected to succeed him at a salary of $6,000 per year. He will leave in a few days for the islands.

Mr. Blouin graduated at the Louisiana State University, and since his graduation has been with Prof. Stubbs at the Louis-

iana Experiment Station. Prof. Stubbs regards him as being one of the best posted men on the cultivation of sugar cane in the world. He is a native of Baton Rouge.

Regarding the possibilities of the cultivation of sugar cane in the Hawaiian Islands, Prof. Stubbs said the soil was the best in the world for the cultivation of cane, being superior to that of Cuba. The yield on the arid and irrigated lands of the islands is from eight to fifteen tons of sugar per acre, while in Louisiana the yield is about 1½ tons per acre. But about all the available lands having been taken up in the cultivation of cane already, the increase of production cannot far exceed the present output. The total value of the agricultural produce of the islands is about $20,000,000, of which $17,500,000 is to be credited to sugar. Thus it will be seen that the islands have already reached, or nearly reached, the limit of yield. The drawbacks to the cultivation of cane in these particularly favored islands are the high price of coal—which reaches as high as $12 per ton—the cost of irrigation and the great cost of sugar house plants. Nevertheless, the profits are so large as to practically preclude the cultivation of any crop but cane.

The Professor brought back with him over 200 photographs to illustrate the report which he will make to the Government, which promises to fill a considerable volume. He has had made stereopticon views of a number of these photos, with which he illustrated a lecture recently made at Calhoun, La., and will have the others prepared for the stereopticon for use in several lectures which he will deliver in different parts of the States, the first at the State University at Baton Rouge. —Louisiana Sugar Planters' Journal.

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THE MANGO IN LONDON.—Can it be that this fruit has only lately found its way into the London market? It would seem so, from the following taken from a London exchange: "Have you seen a curious-looking fruit at the fruiterer's lately? It is of a green color, and shaped somewhat like a squashed Rugby football. Of course, it is smaller. Its skin reminds one strongly of the green lizard's leather, out of which purses are made. Smell it, and visions of eucalyptus and influenza, benzine and motor-cars, with a distant suggestion of a half-decayed pear float across your mind. This compound fruit is the mango. Should mangoes ever become popular in England their skins might be profitably substituted for the red herring in the drag net. Even at the high price at which the mango is at present selling you are apt to think at first sight that you are getting a good deal for your money. Experience will soon disillusion you. Quite three-quarters of the fruit is taken up by its stone, which looks like a large, hairy mussel. Take from the remainder the thick, leathery skin, and little is left to eat. And what is the edible part like? You will never forget your first mouthful of mango. Imagine influenza medicines, turpentine, sugar and soap eaten out of a spoon dipped in paraffin! That is the approximate flavor of a mango to a Londoner's taste.

TWENTIETH ANNUAL MEETING

OF THE

Hawaiian Sugar Planters' Association

The premises formerly occupied by the Association having been leased for a printing office, the annual meeting was held in the spacious hall of the Y. M. C. A.—a central and very convenient place. There was the usual attendance, with representatives from each of the islands.

The president of the Association, Chas. M. Cooke, read his address, which gives a synopsis of the work that had been done during the past year, and referred to the unusually large number of meetings that had been held by the trustees, with a brief sketch of the first meeting held twenty years ago, in what has since been known as Masonic Hall, on the corner of Queen and Fort streets. The address is printed in full here, and should be carefully read by every one, as it recalls the difficulties which surrounded the planters in those days. The question of laborers is far from being settled, and is hedged about with difficulties requiring as close study and patience as in 1880. The reference to rewards offered for labor-saving machines for harvesting canes, and the authority given to a committee to offer rewards for such as may be approved, should be read and the whole subject investigated, as much depends on a thorough study of this new proposition.

ADDRESS OF PRESIDENT C. M. COOKE.

To the Members of the Hawaiian Sugar Planters' Association.

Gentlemen:—It is with much pleasure that we assemble at this our nineteenth anniversary and twentieth annual meeting since our inauguration.

By reference to the Planters' Monthly, Vol. I., No. 1, we find a report of the Planters' Convention held March 20 to 29, in response to a call dated Honolulu, February 2, 1882, signed by nine business houses here, stating the importance of united action in protecting our reciprocity treaty from threatened opposition, as well as "another equally serious matter, the labor question." Reference is also made to the advantage of mutual discussion on "plows, planting, methods of cultivation, varieties of seed, irrigation, transportation of cane and various means of manufacture into sugar with comparison of

results." So as we meet today we find the same questions and subjects are of as great concern to us as in those early days of our great industry. Fifty-five gentlemen met in the room adjoining Honolulu Lodge No. 1, F. & A. M., at this first meeting, and I trust this series of meetings may be of equal interest.

The past year has been one of unusual anxiety and importance, as your trustees can testify and the reports of their forty-eight meetings held since November 24, 1899, and the one special meeting held by you on June 4, bear witness to the numerous important questions which have been presented and acted upon. It has been a year of great changes, not only in the sugar industry, but also in the commercial and political conditions of these Islands.

Your Board of Trustees have considered various subjects at their meetings during the year, and in their behalf I beg to report as follows:

It was voted to provide $1,500 to pay one-half of the salary of a forester to examine into the conditions of our forests here.

In conjunction with the Honolulu Chamber of Commerce, Mr. W. O. Smith was engaged to go to Washington in November, to represent and further the commercial and sugar interests of the Islands pending the making of our Territorial laws by Congress.

The eight meetings held from January 2 to February 22, 1900, were almost wholly taken up in matters pertaining to the presence of bubonic plague in Honolulu, and assisting the Board of Health in every way possible to prevent its spread to the other Islands, at the same time inaugurating ways and means for supplying the plantations with provisions, bags, money, machinery, and the thousand and one things necessary, under strict quarantine regulations, by having steamers load and discharge in the harbor from quarantine wharves, and by providing a fumigating plant, which was wholly under our control and expense. Another important measure considered and acted upon, was the forwarding of sugars received from the various plantations, and the fumigation of vessels, under United States supervision in order to insure cargoes landing in foreign ports. We would mention here that Mr. W. O. Smith rendered valuable assistance in Washington to this end, and were it not for his efforts, Honolulu might have been quarantined against landing cargoes in San Francisco. It was also in the province of your Board to assist the health authorities in forwarding circular letters of instruction as to the action to be taken to prevent the spread of the disease in case it reached the other Islands. It is a matter of congratulation and thanksgiving that the disease only reached Kahului and was there stamped out by the heroic efforts of the Maui people.

Your Association has also assisted the Hawaiian Govern-

ment in guaranteeing assistance, to the amount of $12,000 to the Hawaiian Exhibit at the Paris Exposition.

The question of Italian immigration received much attention and expenditure. Hon. S. M. Damon's mission to Europe to further this cause did not meet with the success we had hoped for.

The matter of negro labor has also been considered and several efforts have been and are being made in this direction. Much attention has been given to the introducing of new labor into the country from Puerto Rico, it being understood that that Island was over populated, and being a part of the United States, laborers could be obtained to the mutual benefit of both districts, and we are expecting the first installment of such laborers shortly. Messrs. S. T. Alexander, W. N. Armstrong and R. Macfee have all given us their assistance to this end.

In July Mr. E. F. Bishop was commissioned with full authority to make arrangements both as to the recruiting and transportation of about fifteen hundred agricultural laborers from the United States, without restrictions or limitations as to terms of wages. He has since resigned, and Mr. C. Wolters has taken up the work, and will assist Mr. George E. Baldwin, formerly Federal Inspector of Immigration, in acting as our agent in New York to engage laborers from newly arrived immigrants, and we hope this source of supply may be a success.

The doing away of the contract system by the United States Government on June 14 has caused grave responsibilities to us all and many meetings have been held to consider the matter of strikes and cancellation of labor contracts, and it was for the consideration of this subject that the special meeting of the Association was called for June 4, that resulted in the formation of Central Committee and labor bureaus in the various districts on the Islands, and the adoption of the pass book system, whereby the plantation managers might act in unison and prevent united action on the part of the laborers in demanding excessive wages.

You are aware that Dr. Maxwell's resignation was accepted during the month of April and that he leaves, with our very best wishes, to take up the same line of work in Queensland. His place we expect to be filled by Mr. R. E. Blouin, who has had nine years' experience under Dr. Stubbs and comes highly recommended by both gentlemen, as eminently fitted for our work.

On account of the whole building on Nuuanu street having been leased to other parties, it becomes necessary for us to remove our laboratory and it is proposed to erect a laboratory building on our lot at Makiki. The matter of the increased tax assessments on many plantations and also on our Experiment Station, has occupied our attention.

During August it was our pleasure to be addressed by Dr.

Stubbs, who visited the Islands under instructions of Mr. Wilson, Secretary of Agriculture, at Washington, for the purpose of locating an agricultural experiment station and to study the agricultural possibilities of these Islands. The merging of our experiment station with the proposed one to be established by the Federal Government, after due consideration, was declined, as it seemed the part of wisdom to have the full time of our director devoted to the sugar interests.

The question of best labor-saving machines for the cutting, loading and planting of canes has been discussed and the matter is now in the hands of a committee to prepare an advertisement offering prizes, and stating terms for machines of the best types, the prizes to be awarded by a committee of practical men.

This is but a brief recapitulation of some of the subjects concerning the Association that have come up during the past year, and it is for you, gentlemen, to bring up for further discussion any one of them, or make inquiries concerning the same.

In the reports of the various committees it is to be hoped that particular attention will be given to the question of our forests, that we may use our united influence in having our fast disappearing woods protected by special acts of the Legislature, and that every plantation management on these Islands may do what they can, not only in saving the forests in their immediate vicinity, but endeavor by earnest efforts to replant and not spare expense in fencing off lands for this object. This is a question of importance not only for the present, but one for the future that will determine the value of our sugar estates.

The address refers to the numerous sessions held by the trustees during the year—forty-eight in all—caused in part by the plague and the various phases of the labor question. It is a satisfaction to know that a trial will soon be made of negro laborers and also of European immigrants to the United States, who have been induced to migrate still further west to these islands. Both these experiments, it is hoped, will aid in solving the labor question. If they result favorably, all the laborers required can be obtained from the same sources.

Dr. Maxwell's report, which had already been printed in pamphlet form, was distributed. It was also printed in the October issue of this monthly. No one can doubt that it has taken a vast deal of labor to secure the results which he has embodied in it, which will be of great value to planters, in one way or another. His caution against the introduction of new varieties of cane from abroad should be borne in mind, and even small bundles or sticks of sugar cane should be watched, as the insects on this plant are often unnoticeable, unless examined by an expert.

The following officers of the Planters' Association were elected: F. A. Schaefer, president; C. Bolte, vice-president;

H. A. Isenberg, treasurer; Wm. Pfotenhauer, secretary; J. B. Atherton, auditor; H. P. Baldwin, W. G. Irwin and George H. Robertson, directors.

Secretary Bolte introduced printed copies of list of sugar plantations, with the crop returns of each for the past season of 1900. The yield of each estate is given in short tons of 2,000 pounds, the total amounting to 289,544. A similar record for the previous year, 1899, gave the total 282,807 short tons.

Secretary Bolte presented his list of plantations, with the year's outcome of each in short tons of 2,000 pounds each, amounting for the current year to a total of 286,000 tons, showing a slight increase over the crop of 1899. The total would have been considerably larger, had it not been for the dry season, in which all the plantations shared. It will be seen that there are fifty-two estates, of which 24 are on Hawaii, 9 are on Maui, 12 are on Kauai and 7 are on Oahu.

STATEMENT OF HAWAIIAN SUGAR CROP, 1899-1900—FROM OCTOBER 1st, 1899, TO SEPTEMBER 30th, 1900.

	Tons.	Total Tons.
HAWAII.		
Waiakea Mill Co	9,226	
Hilo Portuguese Sugar Mill Co	967	
Hilo Sugar Co	7,841	
Onomea Sugar Co	7,131	
Pepeekeo Sugar Co	6,207	
Honomu Sugar Co	5,328	
Hakalau Plantation Co	11,931	
Laupahoehoe Sugar Co	4,119	
Ookala Sugar Co	3,302	
Kukaiau Plantation Co.	1,525	
Kukaiau Mill Co	1,530	
Hamakua Mill Co	6,078	
Paauhau Plantation Co	7,629	
Honokaa Sugar Co	8,117	
Pacific Sugar Mill	4,774	
Niulii Mill and Plantation	1,805	
Halawa Plantation	1,571	
Kohala Sugar Co	3,345	
Union Mill Co	2,265	
Hawi Mill (R. R. Hind)	2,277	
Beecroft Plantation	632	
Kona Sugar Co	285	
Hutchinson Sugar Plantation Co	8,338	
Hawaiian Agricultural Co	9,001	
		115,224
MAUI.		
Kipahulu Sugar Co	1,890	
Hamoa Plantation	2,114	

	Tons.	Tons.
Hana Plantation Co	3,406	
Haiku Sugar Co	5,512	
Paia Plantation	6,795	
Hawaiian Commercial & Sugar Co	17,858	
Wailuku Sugar Co	7,976	
Olowalu Co.	1,480	
Pioneer Mill Co., Ltd	10,316	
		57,347
OAHU.		
Waimanalo Sugar Co	2,932	
Heeia Agricultural Co., Ltd	2,309	
Laie Plantation	179	
Kahuku Plantation Co	5,647	
Waialua Agricultural Co	1,516	
Waianae Co.	4,019	
Ewa Plantation Co	21,573	
Oahu Sugar Co	15,450	
		53,625
KAUAI.		
Kilauea Sugar Co	5,254	
Makee Sugar Co	8,575	
Lihue Plantation Co	15,289	
Grove Farm Plantation	1,962	
Koloa Sugar Co	5,004	
McBryde Sugar Co	1,790	
Hawaiian Sugar Co	13,480	
Gay & Robinson	2,001	
Waimea Sugar Mill Co.	976	
Kekaha Sugar Co	8,287	
Estate V. Knudsen	730	
		63,348
Total (in short tons)		289,544

AGENTS.

	Tons.	Tons.
W. G. IRWIN & CO., LTD.		
Paauhau Plantation Co	7,629	
Hutchinson Sugar Plantation Co	8,338	
Hakalau Plantation Co	11,931	
Hilo Sugar Co	7,841	
Kilauea Sugar Co	5,254	
Waimanalo Sugar Co	2,932	
Olowalu Co.	1,480	
		45,405
H. HACKFELD & CO.		
Lihue Plantation Co	15,289	
Grove Farm Plantation	1,962	
Koloa Sugar Co	5,004	

	Tons.	Tons.
Kekaha Sugar Co	8,287	
Pioneer Mill Co	10,316	
Kipahulu Sugar Co	1,890	
Kukaiau Plantation Co.	1,525	
Hilo Portuguese Sugar Mill Co	967	
Oahu Sugar Co	15,450	
		60,690
THEO. H. DAVIES & CO.		
Waiakea Sugar Co	9,226	
Pepeekeo Sugar Co	6,207	
Laupahoehoe Sugar Co	4,119	
Kukaiau Mill Co	1,530	
Hamakua Mill Co	6,078	
Niulii Mill	1,805	
Union Mill Co	2,265	
Hawi Mill (R. R. Hind)	2,277	
Beecroft Plantation	632	
McBryde Sugar Co	1,790	
		35,929
C. BREWER & CO., LTD.		
Hawaiian Agricultural Co	9,001	
Wailuku Sugar Co	7,976	
Honomu Sugar Co	5,328	
Hamoa Plantation	2,114	
Makee Sugar Co	8,575	
Onomea Sugar Co	7,131	
Ookala Sugar Co	3,302	
		43,427
CASTLE & COOKE, LTD.		
Waialua Agricultural Co	1,516	
Ewa Plantation Co	21,573	
Kohala Sugar Co	3,345	
Waimea Sugar Mill Co.	976	
		27,410
ALEXANDER & BALDWIN.		
Hawaiian Sugar Co	13,480	
Paia Plantation	6,795	
Haiku Sugar Co	5,512	
Hawaiian Commercial & Sugar Co	17,858	
		43,645
F. A. SCHAEFER & CO.		
Honokaa Sugar Co	8,117	
Pacific Sugar Mill	4,774	
		12,891
M. S. GRINBAUM & CO., LTD.		
Hana Plantation Co	3,406	
Heeia Agricultural Co., Ltd	2,309	
Kahuku Plantation Co	5,647	
		11,362

	Tons.	Tons.
HENRY WATERHOUSE & CO.		
Laie Plantation	179	
Gay & Robinson	2,001	
Halawa Plantation	1,571	
		3,751
J. M. DOWSETT.		
Waianae Co.		4,019
H. M. VON HOLT.		
Estate V. Knudsen		730
M. W. McCHESNEY & SONS.		
Kona Sugar Co		285
Total (in short tons)		289,544

HAWAIIAN SUGAR PLANTERS' ASSOCIATION.
By its Secretary,
C. BOLTE.

Honolulu, October 22, 1900.

The second day's session was taken up with reading reports and discussions on the same. The report on forestry—one by Mr. Horner, showing that forests only encumber the land, and should give way to farmers who will till the soil and carry on agricultural pursuits, and the other by Mr. O'Shaughnessy, strongly in favor of preserving them. Both reports are printed in full, but the contrast between the two is very strong, as they take opposite views of the question. Mr. O'S. urged cooperation of the government and planters in preserving the forests.

Paul Isenberg, Sr., spoke very forcibly of the changes that had taken place since he came to Hawaii. It was useless, he said, to give a man a homestead unless he could make a living on it, and he could not do that unless he could get his products to market. Kamehameha III was the greatest homesteader we have had. He gave to every native a piece of land, and that has proved a curse to the Hawaiians. They couldn't use their homesteads and the only thing they could do was to sell them. So it is and will be with homesteads now, unless the homesteader can readily use his land. Under present conditions he can only cut the wood off it and sell that and then some time sell the land. He believed every bit of land that was not needed for other purposes should be put in forest. He pointed to the conditions up Nuuanu valley, where the land under control of the government was covered with new forest, while that under control of private individuals was bare and treeless.

Secretary Bolte also prepared and presented the following table showing the sugar crops of Hawaii for the past ten years:

SUGAR CROPS OF THE HAWAIIAN PLANTATIONS, 1891 TO 1900.

Prepared for the Hawaiian Sugar Planters' Association, by C. BOLTE, Secretary.

HAWAII—	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Waiakea Mill Co.	4,877	3,604	3,836	6,416	5,028	6,410	8,239	7,763	9,191	9,226
Hilo Portuguese Sugar Mill Co	.....	.....	.....	.....	.....	105	661	260	932	967
Hilo Sugar Co.	5,377	4,523	6,044	8,468	5,514	7,216	6,744	8,390	6,880	7,841
Onomea Sugar Co.	5,350	6,260	6,883	9,400	5,907	10,013	10,432	8,904	8,404	7,131
Pepeekeo Sugar Co.	3,192	3,431	4,773	5,709	4,097	6,502	7,474	6,914	7,350	6,207
Honomu Sugar Co.	2,239	2,112	2,485	3,534	2,895	3,844	5,181	4,932	4,968	5,328
Hakalau Plantation Co.	6,970	3,989	5,327	5,234	4,115	7,675	9,461	9,218	8,980	11,931
Laupahoehoe Sugar Co.	2,497	2,131	1,410	.....	1,354	2,430	6,032	3,971	5,337	4,119
Ookala Sugar Co.	1,968	1,577	1,562	1,575	835	3,261	2,583	3,555	3,564	3,302
John N. Wright	73	75	.....	.....	.....	.....	.....	.....	.....	.....
Kukaiau Plantation Co.	943	1,089	377	600	766	890	1,817	1,170	1,748	1,525
Kukaiau Mill Co.	934	1,089	377	610	800	890	1,818	1,170	1,732	1,530
Hamakua Mill Co.	4,519	3,015	2,550	3,431	3,583	7,330	9,050	4,133	6,081	6,078
Paauhau Plantation Co.	5,677	4,200	3,008	4,500	5,343	10,957	10,135	3,509	7,529	7,629
Honokaa Sugar Co.	3,658	2,864	1,528	2,567	2,905	6,774	10,018	6,198	9,111	8,117
R. M. Overend	547	309	290	467	.....	.....	.....	.....	.....	.....
W. H. Rickard	1,065	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pacific Sugar Mill	4,202	3,614	1,894	2,620	2,931	5,885	6,700	3,327	4,650	4,774
Niulii Mill and Plantation	1,605	968	701	1,000	629	1,468	2,317	1,349	2,226	1,805
Halawa Plantation	703	537	700	1,039	687	1,198	1,406	800	1,049	1,571
Kohala Sugar Co.	3,833	2,365	2,203	2,543	2,510	3,778	4,903	1,508	4,119	3,345
Puehuehu Plantation	1,606	1,242	974	803	831	1,256	1,007	.....	.....	.....
Union Mill Co.	959	990	844	803	997	1,230	994	1,068	1,668	2,265
Hawi Mill (R. R. Hind)	2,972	2,095	1,230	1,470	1,604	2,775	1,823	877	1,222	2,277
Beecroft Plantation	1,455	981	754	765	863	1,043	1,485	426	609	632
Kona Sugar Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	285
Hutchinson Sugar Plantation Co	5,510	3,158	3,255	4,040	5,709	9,179	7,544	7,104	7,732	8,338
Hawaiian Agricultural Co	4,135	2,333	3,796	4,440	1,608	6,660	8,553	4,795	11,318	9,001
L. C. Chong—Pahala	.....	.....	277	165	132	530	359	265	839	.....
Total Hawaii	76,866	58,551	57,078	72,199	61,643	109,299	126,736	91,606	117,239	115,224

Sugar Crops of the Hawaiian Plantations, 1891 to 1900.

(CONTINUED.)

MAUI—	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Kipahulu Sugar Co.	1,445	1,103	1,639	1,912	976	1,787	2,047	2,250	1,931	1,890
Hamoa Plantation	2,210	1,104	945	868	1,119	1,378	852	1,411	2,026	2,114
Hana Plantation	3,954	2,052	2,154	2,596	2,492	2,771	2,350	2,141	3,175	3,406
Huelo Plantation	960	942	.....	.....	.....	.....	.....	.....	.....	.....
Haiku Sugar Co.	4,188	4,208	4,289	3,581	3,688	4,986	5,400	4,648	4,865	5,512
Paia Plantation	4,643	4,471	5,512	5,456	4,880	5,606	6,376	5,801	6,268	6,795
Hawaiian Commercial & Sugar Co.	11,341	7,785	11,106	11,429	6,788	11,933	12,537	15,072	16,621	17,858
Waihee Sugar Co.	1,129	1,163	1,369	1,801	.....	.....	.....	.....	.....	.....
Wailuku Sugar Co.	2,087	1,924	2,117	1,762	4,900	5,655	6,461	6,725	7,412	7,976
Waikapu Sugar Co.	1,061	802	534	786	.....	.....	.....	.....	.....	.....
Olowalu Co.	760	859	702	937	905	1,163	1,112	1,425	1,502	1,480
Pioneer Mill Co., Ltd.	2,332	1,977	2,303	2,558	1,987	3,818	3,912	5,560	10,589	10,316
Total Maui	36,110	28,390	32,670	33,686	27,735	39,097	41,047	45,033	54,389	57,347
OAHU—										
Waimanalo Sugar Co.	4,538	1,010	1,560	1,650	1,600	3,370	2,230	3,004	2,352	2,932
Heeia Agricultural Co., Ltd.	1,719	1,396	2,191	1,660	1,472	1,915	1,798	2,167	2,191	2,309
Laie Plantation	85	.....	340	125	100	101	78	300	494	179
Kahuku Plantation Co.	.....	2,387	4,026	3,973	2,672	3,369	3,976	4,356	7,008	5,647
Waialua—Halstead Bros.	568	871	947	662	872	1,019	1,886	2,015	.....	.....
Waialua Agricultural Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,516
Waianae Co.	2,069	2,206	3,114	2,940	2,500	3,884	3,804	4,055	3,506	4,019
Ewa Plantation Co.	.....	2,825	7,686	7,833	8,217	12,124	15,157	18,284	22,334	21,573
Oahu Sugar Co.	.....	.....	.....	.....	.....	.....	.....	.....	7,935	15,450
Total Oahu	8,979	10,695	19,864	18,843	17,433	25,782	28,929	34,181	45,820	53,625

Sugar Crops of the Hawaiian Plantations, 1891 to 1900.

(CONCLUDED.)

KAUAI—	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Princeville Plantation Co.	.....	.....	497	.....	.....	.....	.....	.....	.....	.....
Hanalei Sugar Mill	475	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kilauea Sugar Co.	2,284	2,582	3,112	3,502	4,050	5,507	4,651	4,563	5,420	5,254
Makee Sugar Co.	6,112	6,837	7,659	6,537	7,454	7,439	9,175	8,510	9,350	8,575
Hanamaulu Mill & A. S. Wilcox	1,689	3,730	3,752	3,445	1,997	2,386	2,550	3,194	3,962	.....
Lihue Plantation Co.	4,892	2,832	3,688	3,893	6,872	8,883	9,642	10,914	13,333	15,289
Grove Farm Plantation	1,032	2,127	2,333	1,762	1,141	1,632	1,513	1,355	1,751	1,962
Koloa Sugar Co.	2,074	2,132	2,828	2,106	2,278	3,852	3,825	4,327	5,268	5,004
A. H. Smith & Co.	420	226	.....	364	162	675	176	469	.....	.....
Eleele Plantation	1,065	800	1,284	986	977	1,232	1,400	1,489	.....	.....
McBryde Sugar Co.	.....	.....	.....	.....	.....	.....	.....	.....	1,491	1,790
Hawaiian Sugar Co.	.....	.....	12,800	13,392	11,172	11,407	11,167	13,200	14,350	13,480
Gay & Robinson	120	.....	1,300	1,052	1,509	1,508	1,510	1,600	1,821	2,001
Waimea Sugar Mill Co.	375	756	733	822	509	1,183	1,050	1,026	1,021	976
Meier & Kruse	1,056	.....	.....	.....	952	1,245	1,505	1,518	.....	.....
Kekaha Sugar Co.	1,611	1,958	1,309	2,470	2,054	2,602	3,483	3,480	6,942	8,287
H. P. Faye & Co.	554	663	1,714	1,373	1,102	1,357	1,824	1,961	.....	.....
V. Knudsen	460	.....	.....	.....	587	742	943	988	650	730
Total Kauai	24,219	24,643	43,009	41,704	42,816	51,650	54,414	58,594	65,359	63,348

	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
HAWAII	76,866	58,551	57,078	72,199	61,643	109,299	126,736	91,606	117,239	115,224
MAUI	36,110	28,390	32,670	33,686	27,735	39,097	41,047	45,033	54,389	57,347
OAHU	8,979	10,695	19,864	18,843	17,433	25,782	28,929	34,181	45,820	53,625
KAUAI	24,219	24,643	43,009	41,704	42,816	51,650	54,414	58,594	65,359	63,348
GRAND TOTAL	146,174	122,279	152,621	166,432	149,627	225,828	251,126	229,414	282,807	289,544

REPORT ON THE MANUFACTURE OF SUGAR.

To the President and Members of the Hawaiian Planters' Association,
Honolulu.

Gentlemen:—As one of your committee instructed to report on manufacture, I have chosen, what in my opinion, is one of the most interesting phases of the newer departures in that branch, viz: The Crystallization of Sugar in Motion.

I have made a careful study of the process since its installation at the Oahu Sugar Co.'s mill and have arrived at the conclusion that its advantages are so manifold, that if once generally understood no progressive mill can be considered complete or up to date without its introduction into their plant.

Compared with the old method of working out three or four grades of sugar the Crystallization in Motion process will immediately demonstrate its superiority to the most casual observer for various reasons:

First. The first three grades of sugar obtained by the old method are, by the new process gained at once all in one grade.

Second. As to be expected from new plantations the purity of green juice was low, being only 84.5 for whole crop, but yet this first grade of sugar polarized 97 degrees and more, and constituted about 94-95 per cent. of the total production.

Third. This 95 per cent. sugar is ready for shipment within 48 hours from the time the cane enters the rollers.

Fourth. The No. 4 sugar, which with the new process is the second and last grade, is finished in only two weeks after having been boiled in the pan.

Fifth. The massecuite of first and last sugar is not touched until its arrival at the centrifugals. This feature alone should recommend it not only as a great labor saver but as a boon to all who regard neatness and cleanliness as desirable features in a sugar mill. It prevents filth, accumulation of dirt, that horrible stench arising from fermentation and kindred evils so inimical to sugar producers, and yet, I regret to say, a most conspicuous feature in so many mills.

Sixth. At the end of the campaign this dilatory, irritating work about the sugar house is absent—two weeks after the last cane is crushed steam is shut off and you are done.

Seventh. The amount of sugar lost in the off molasses is much less than with the old method.

Eighth. The keeping quality of the sugar obtained is excellent. Change in polarization during transit to the Coast is practically nil.

The second product obtained is too low for profitable marketing and is therefore remelted and mixed with the juice at the proper place and time, but the quantity is so small that it in no way interferes with other work and I believe, that with the high purity usually secured on the island of Hawaii even

this small percentage of second grade would be materially reduced.

Sugar made so rapidly and without handling very largely decreases the loss of inversion. Our last molasses during the entire crop contained only from 7 to 12 per cent. of glucose in comparison with from 16 to 24 per cent., and frequently even more, found in old fashioned mills. It can therefore be surmised that the quantity of glucose being one-half, a corresponding amount of sucrose nearly equivalent has been gained by the new process. I may also add that our end molasses has a lower purity than that of any mill on Oahu.

It is to be made our aim here at Oahu Plantation to so perfect the system that but one grade will be made, without even the remelting of the present 5 or 6 per cent. and when that consummation is attained it will leave but little to be wished for.

If there are any points I have not made clear I will be happy at any time to explain more fully to those whom this may interest.

AUG. AHRENS.

October 14, 1900.

REPORT OF THE COMMITTEE ON EXPERIMENTAL STATION.

The evident duty of this committee is to lay before the Association an account of all the work of an experimental and analytical character done at the Station during the past year, but as these matters will be comprehensively dealt with by the Director, this committee feels that there is no necessity for it doing more than briefly referring to this work.

At the time of the establishment of the Station and Laboratory the need for both had become very evident to all interested in sugar plantation work. Managers of plantations had neither the time nor the necessary qualifications for the proper conduct of exhaustive experiments in cane culture, irrigation, etc., and the system of fertilization pursued was, speaking generally, of a haphazard character, without proper guidance or control, usually on the advice of the representative of the fertilizer manufacturer, and but rarely on the basis of any analysis of soil, so that it was unanimously decided by the planters that there should be established a field station where useful experiments in cane cultivation might be conducted, and a laboratory where soil analyses could be made, followed by prescriptions for and the analyses of fertilizers.

Since the establishment of the field station a large number of most valuable experiments have been made, the details of which are fully set forth in the Director's report. Some of these experiments dealt with cane varieties, and from them familiarity with the most desirable descriptions for use on these islands has been acquired. The experiments in planting have doubtless attracted the attention of all planters, show-

ing, as they do, the relative advantages of the different methods in vogue; and the irrigation experiments, for many reasons, must have proved of great value to managers of irrigated plantations, especially by demonstrating the amount of water actually needed for cane. Besides these, other interesting and useful experiments have been conducted during the past five years on the field station, fully justifying the support the Association has given to this important branch of its work, and the time and knowledge the Director has devoted to it.

On the foundation of the laboratory, and for twelve months or so thereafter, a large number of soil analyses were made, followed by a large number of fertilizer analyses. The earlier soil analyses disclosed the fact that for years many of the plantations had been using fertilizers ill adapted to their requirements, and frequently not what they purported to be, and that where the analyses did correspond with the guarantees some of the ingredients were present in a form entirely unsuited to the climatic and other conditions of the district where the fertilizers were to be applied.

It has been the aim of the Director to remedy this state of affairs by frequent visits to the plantations, interviews with the managers, recommendations of desirable fertilizers based on soil analyses, and the examination of the fertilizers as they came from the manufacturers.

For the first year by far the greater part of the fertilizers were analysed before being paid for or used, and the amount of rebate which manufacturers were obliged to make was considerable, resulting in more reliable goods being furnished. Since then, your committee regrets to state, the benefits of protection afforded by the Association laboratory have not been availed of to anything like the fullest extent. At the request of your committee the Director informs it that certain plantations have never had their soils examined in the Association's laboratory, never sought advice concerning fertilizers, nor submitted their fertilizers for inspection. This appears to be a blind course to pursue. The specific advantage of knowing just what soils demand and the assurance that the fertilizer required and paid for is supplied, is lost. Some of those plantations from whom fertilizer samples were at first received have of late been less careful to have analyses made, but it is satisfactory to note that a good many managers have still the good sense to satisfy themselves that they get what they pay for. It is hardly to be supposed that a manager will contend that he should not know, through the medium of an analysis of soil, just exactly of what ingredients the fertilizers he uses should be composed, or that he should not satisfy himself that he is getting the fertilizer he has ordered and paid for, and yet it is still the custom with some managers to rely entirely on their own opinions or those of manufacturers' agents concerning the proper fertilizer to use, and to blindly confide in the good faith and perfect accuracy of the manufac-

turer who supplies it, when there are at hand all facilities for soil and fertilizer analyses, which, if availed of, would either fortify or correct the said opinions and endorse the goods of the manufacturer or secure from him a rebate where inaccuracies arose. The apparent disposition on the part of some plantation directors to drift back to the loose and antiquated methods of using fertilizers, prevailing at a time when no laboratory existed on which they could implicitly rely as a check on natural errors or intentional frauds, is to be regretted, especially at a time when such vast and increasing sums of money are being expended on fertilizing material.

There are used in these Islands at present over 30,000 tons of fertilizers annually, costing in the neighborhood of a million and a quarter of dollars, and it seems to your committee that those who are responsible for the expenditure of this immense amount of money should spare no pains to satisfy themselves that they are receiving the proper value therefor. Among the large body of our managers there are perhaps some whose scientific attainments justify them in acting on their own responsibility in selecting fertilizers, and resting satisfied with the analyses made under their supervision in their own laboratories, but for the protection of those not so well fitted with chemical knowledge and of the interests represented by all managers, your committee is strongly of opinion that no fertilizers should be applied to any of the plantations of the islands without first having been subject to examination at the Association's laboratory. It is also of the utmost importance from another point of view that all fertilizers should be examined, as managers would thereby be relieved from any suspicion which might otherwise attach to them in consequence of the reprehensible custom which has manifested itself of late on the part of certain manufacturers of offering commissions to those whose patronage is desired, frequently accompanying such offers by a suggestion that examination of the fertilizer is unnecessary.

The Association should strenuously oppose all attempts to do business on such lines, and as managers hold positions of great responsibility and trust it is due to them and to those interested in plantation properties that security should be given that all fertilizers used are of the proper kind, and come up to the required standard, and this, it is submitted, can only be insured by the regular use of the Association's laboratory.

The sugar planting community of these islands has, in the experimental station and laboratory of this Association, the most valuable aid to the cultivation of cane and manufacture of sugar, and a thorough protection in the purchase and use of fertilizers, and your committee strongly advises that the fullest advantage be taken of this aid and protection, so that the industry, of which we have all such reason to be proud, may not fail to prosper by reason of the existence of pre-

judice, or of an indisposition to recognize the help which can be obtained by a greater reliance on science.

F. M. SWANZY,
H. P. BALDWIN.

Honolulu, Oct. 16, 1900.

Note.—Mr. Geo. H. Robertson, the third member of this committee, is ill and confined to his house, so he has not seen this report.

REPORT OF COMMITTEE ON LABOR.

TO THE PRESIDENT AND MEMBERS OF THE HAWAIIAN SUGAR PLANTERS' ASSOCIATION.

GENTLEMEN:—At different periods in the history of the sugar industry of these islands, the question of obtaining a sufficient supply of agricultural laborers for our fields has caused us anxiety. Each time a solution has been reached, and once more the question of a scarcity has come before us, and is emphasized because of the large proportions to which the industry here has grown.

A satisfactory field labor had been found in the Japanese, who, up to the 14th day of June last, were working, on the whole well on our plantations. Most of them were under three year contracts, at wages of $15.00 to $16.00 per month, with the usual perquisites of house, fuel, water, and medicine.

On June 14th last when the Territorial Act came into effect, the three year contracts then existing with the Japanese were by that Act abolished, and the source of supply was at the same time cut off. This released all the contract Japanese in the islands and the result has been a demand for higher wages, and a gradual drifting of the Japanese population to those districts that are more favored as regards water supply and climate. In these places, such as the Hilo District of Hawaii, the Wailuku Plantation on Maui, &c., the planters have generally been able to command such labor as they required at reasonable prices, but in other drier districts the shortage of labor has been severe and at times critical.

As soon as these difficulties became apparent, joint action was taken through the Hawaiian Sugar Planters' Association to meet them. Contract laborers were receiving $15.00 to $16.00 per month at the time of the change. The Hawaiian Sugar Planters' Association left the fixing of wages for various districts in the hands of the different island sub-associations, but named $18.00 as the maximum in any case.

From information collected in July last from forty-seven plantations by a committee of the Association, it was found that in only one case had the laborers agreed to work out their contracts. Amongst these Japanese laborers there seems to be an entire absence of any appreciation of the moral compulsion of a promise.

Wages were raised to a different extent in different districts, but the average monthly wage paid in July by the forty-seven plantations referred to above was $16.75. Since that

date several plantations have been obliged to raise the rate considerably above that figure.

Recourse has been had to the system of letting out the cultivation of fields by contract, and even doing the work of cutting cane at a contract price per ton. This plan has generally proved successful, though the cost of such work has often exceeded the limit of $18.00 placed by the Association. This is inevitable, since the plantations situated in dry and arid places are bound in some way to pay considerably more than their more fortunately situated neighbors, and as they are not allowed to make this difference appear in a regular monthly wage, they are compelled to fall back on the indirect system of contracts, which result to the laborer in a higher remuneration.

It appears that if the Hawaiian Sugar Planters' Association wish to establish a fair comparative rate of wages for the Islands, they should appoint a trustworthy committee to rate the different plantation districts, placing a maximum limit on the different districts both for day and contract labor. If this could be properly carried out, it would place all districts on an equal footing in their efforts to secure laborers.

After June 14th many Japanese struck work, demanding that their contracts be returned to them, cancelled. It appeared that in hardly any case had the plantation previously given the men the one copy of the contract which was really their due.

In 43 cases contracts (one or two copies) were now returned to the men, but in only 7 cases were they actually cancelled first by the plantation.

In spite of these concessions, the Japanese took up a very independent attitude. Of the 43 plantations who gave the information, we find that from June 14th to June 30 last, on 39 plantations, 2,227 laborers left work; on 4 plantations none had left. Besides this, a number of men lie off every other day in their houses, and the general quality of work done now, is poor.

In 44 cases out of 47 the laborers whose contracts had been given to them, were still allowed house, water, etc., free.

To reach some idea of the number of laborers employed by our plantations, we would refer to some figures compiled on March 31st, 1899, when the labor supply may be said to have been normal.

On the 49 plantations whose figures were obtained, there were employed of all nationalities, thirty-two thousand and thirty-six persons, made up as follows:

American or European		3,139
Hawaiian		1,377
Japanese	20,800	
Chinese	6,720	
		27,520
		32,036

Since March 31st, 1899, the Custom House figures show the following arrivals to, and departures from, the country:

Arrived.	Japanese.	Chinese.
Last 9 months of 1899	18,637	795
Jan. 1st to June 14th, 1900	6,017	303
June 14th to Sept. 30th, 1900	56	503
Grand total Mar. 31, 1899, to Sept. 30, 1900.	24,710	1,601

During this period departures were as follows:

Departed.	Japanese.	Chinese.
Last 9 months of 1899	2,057	1,198
Jan. 1st to June 14th, 1900	983	644
June 14th to Sept. 30th, 1900	1,360	1,363
	4,400	3,205

There are, on the whole, therefore, 20,310 more Japanese in the country than there were on March 31st, 1899, while there are fewer Chinese by 1,604 than there were—a net gain of 18,706 to the Asiatic population.

During this period new plantations have begun work, employing about four thousand laborers.

There is still a considerable margin of increase in the available supply, but the conditions have altered, and there is no inducement to the Japanese to remain on unpopular plantations. This state of affairs must remain till it can be shown that we have an alternative source of supply.

On September 30th, 1900, there were employed on 52 plantations, whose figures have been received, 31,740 laborers, while to have been properly equipped the number required would have been 39,996. That the present laborers are not working anything like so efficiently as they were must be borne in mind in comparing the figures given above. These figures show that on September 30th, there was a total shortage on the fifty-two plantations mentioned above of 8,256 laborers, but the shortage would not have been so large, if those who were at work were doing a fair day's labor, and working steadily through the month.

Three plantations—one each on Hawaii, Maui and Kauai—have not furnished the committee with figures asked for. On March 31st, 1899, these three plantations were employing 2,667 Japanese, Chinese and Hawaiians. So that the 39,996 laborers given above as really needed for these fifty-two plantations, we may add at least 2,670 for these three remaining plantations—a total for 55 plantations of, say 42,670 persons. This shows an increase of 13,773 over the numbers of Chinese, Japanese and Hawaiians given as employed on March 31st, 1899, and during this period a net addition of 18,706 persons has been made to the Asiatic population. Still the plantations are short over 8,000.

We desire to include here in our report, an interesting letter contributed by Mr. H. Morrison, a member of our com-

mittee. It describes very well the actual situation as viewed by a practical cane planter:

Makaweli, Kauai, H. I., Oct. 11, 1900.

T. CLIVE DAVIES, ESQ., Honolulu.

DEAR SIR:—Our labor has given us but little trouble on account of strikes or such like, but the men are far from being settled in their ways. Some weeks we will have abundance at work daily and then again we find them staying about their houses or visiting friends on other islands; and so the work generally is done in an irregular way or neglected. I find Chinese just as inconsiderate as Japanese.

I am satisfied, however, that for our cheap labor we shall have to eventually turn to the yellow East in spite of the fact that they have disappointed us recently. I do not feel that we have advanced a single step in solving our labor problems if we give out portions of our lands, or all of them, to be cultivated by companies, as is again coming up in some places. We have been through this phase of labor before now, even as far back as twenty years ago. I am not aware of anyone who has a good word for this, neither do I know anyone who has had such an experience, who either as contractor or as property owner, to have expressed himself as honestly treated when the accounts were finally settled. This, of course, does not apply to small patches of land, which from their position are not of great value to the plantation, but which may tempt two or three hardy Japs or Chinese to try their luck in independent cultivation because their cane finds a ready buyer. I refer to the larger issue, where large areas are in question.

W. L. Bass in his work on sugar cane (page 44-45) says: "In modern times, the tendency is for the factory to purchase the canes from the farmers at a fixed or fluctuating price, payable either in money or sugar. This is a most unsatisfactory arrangement, though few as yet have reached this decision." . . . "The rate paid for cane to the farmer has an upward tendency always, and eventually the whole enterprise is rapidly demoralized as regards wages and constancy of help. Besides, the cleanliness or otherwise of the farmers' cane affects the weight and the yield and calls for an amount of patience little conceived of by others who are not engaged in the business.

"Let the planters awake to the fact that the cane is not the most costly part of the enterprise." . . . "The farmers, usually waste their profits in outbidding each other for labor and the estate or factory soon finds itself so situated as to be unable, at a later date, to help the planting interest in loans of labor or money. So long as everything runs smoothly the price of sugar high or the price of labor low, matters may go along with apparent prosperity to both, but let a serious fall take place in sugar or a sharp rise in wages, and the bottom not only drops out of the farmer but the factory or estate can

be certain of an appreciable decline in the tonnage at no distant date."

I cannot help quoting in full Senor Bass' closing paragraph: "If a planter takes up a poor but hard-working and thrifty individual and installs him as a farmer and provides all the necessary funds, tools, etc., the farmer will prosper until he begins to wonder how it can be possible that anybody is doing business on a live-and-let-live basis. Once he is reasonably well off, he begins to lose considerable sleep in the endeavor to find out how much or just where he is being elevated. If unable to discover, he usually consults a lawyer or the ever-handy parasitical adviser and so estranges himself more and more from the planter. The result is a violent disagreement, much expense for the planter and ruin for the farmer. How many planters reading these lines will say, 'It is not only the old story, but the universal one.' If the installed farmer is an elegante, theoretical, individual whose chief concern is the cultivation of long clean finger nails as an indication that he lives by his intellect, the story is a short one as regards harmony, and a long one as regards discord. Any planter who cultivates his own fields need never envy a neighbor who has 'farmers.'"

The term "dependent farmers" is not used in the correct sense, for really, where they are installed, the planter, though loth to acknowledge it, is dependent on the farmer.

Much might be said upon the changed conditions now, as compared with say 15-18 years ago, of raising sugar cane. Formerly 70 per cent of all our sugar was a growth from natural rainfall, and costly appliances which now-a-days are required to lead irrigation water were not thought of. This season more than 70 per cent of our sugar is the result of expensive methods of pumping, piping, etc.—all representing the labor of white men only.

We require now-a-days the white man as represented by these engines, pumps, pipes, etc., but as a smaller outlay we require the humbler work of the Asiatic; and should this be grudgingly refused us, it will not be long before the work of the white man will cease to yield an inducement in this business.

Yours truly,

H. Morrison.

And now having referred to the circumstances as they were and as we now find them, we would touch on the efforts that are being made to remedy the difficulties.

A small lot of Portuguese from the United States have been introduced into one district, and the results were eminently satisfactory. A party of negroes from the Southern States are expected, and are awaited with interest. We also look with hope towards Puerto Rico from which (as it is a part of the United States) it is expected we shall be permitted to draw labor.

Your committee regret that this report cannot close with a definite report of progress; while the situation is serious they feel convinced that the trustees are testing every possible channel of supply and are not without hope that some relief will shortly be found.

Respectfully submitted,

T. CLIVE DAVIES,

Oct. 22nd, 1900. Chairman.

DISEASES OF THE CANE.

FURTHER NOTES ON THE SUGAR CANE BORER. SPHENOPHORUS OBSCURUS, Boisd.

On your last annual meeting I sent a short report on the cane-borer from Sydney, Australia, being then on a trip to investigate the condition of same in the Fiji Islands, and herewith I give further notes relating to the same.

HABIT OF THE INSECT.

The principal food plant of the beetle as far as known is the sugar cane on the Hawaiian Islands, Fiji, New Guinea, and lately in Queensland, besides it is found on a great variety of succulent plants, many species of palms are affected and even destroyed, such as the cocoanut, the royal and cabbage palms, the two native species of *Pritchardia* have been seen destroyed by same, and several others. The banana plant is often seriously affected, not so much on these islands as in Fiji. The papaia plant must be included, as least, in a decomposing condition, in which state it appears to live upon many plants. We have seen a trunk of the common *Caryota urens*, cut up in lengths of about 3 feet and used as flower stands in a garden, completely riddled with holes made by this beetle, and they were still present within two years or more after the tree had been cut. Any tender or decomposing part of palms seems to answer them as food.

Brother Newell of Hilo writes me lately that large numbers of cane-borer-beetles were attracted upon shafts of leaves of the royal palm a few days after falling from the trees, and they would continue to come for weeks after. As previously stated, if the interior part of sugar cane cannot be reached, the beetle will live for weeks behind the sheaths of leaves while yet tender, and here feed upon the epidermis of same.

Several species of *Sphenophorus* are known in the United States as boring into the stalks and roots of corn, and they are also found breeding in roots of the "Cat-tail," *Typha latifolia.* Many of the species are attracted to plants growing in deep and swampy places, our own species is no exception, it is found most numerously in such localities where the cane will grow rank and soft. Upon these the task of placing the eggs in position is far easier than into hardened plants that are rarely seriously affected.

Often the *Sphenophorus* beetle has been seen flying during the hottest part of the day, around mills in operation on these

Islands, most numerously they were observed on Kauai at sun-set until dusk, coming from a recently burned field across the road and settling down upon the young plants. Its wings are well developed and its flight is very rapid, so much so as to be with difficulty followed with the eyes.

The borer is not attracted by light, nor have we had the slightest success with poisoned sweets, in fact nothing is known to attract those beetles than the pieces of split cane which they will hunt up, especially when fermenting, any time during day or night.

LIFE HISTORY.

The female beetle is easily separated from the male by its longer, smoother and more slender beak, and its pointed terminal segment. She lays her eggs consecutively, probably four to eight each day, but less than this towards the end of the period of six or eight months during which she continues to lay. When the egg is laid in the cane from the outside, this is done from under the sheath, which the beetle can brace against, with the prominent saw-like movable teeth laterally, she first begins to eat out the hole until softer ground is struck, so to speak, when she will force the work, moving the head up and down as well as sideways until the whole length of the beak is buried. Upon soft parts on split cane this operation takes from 1½ to 2 minutes; no doubt much longer in boring through the hard epidermis, probably hours. After the hole is completed, the beetle walks up and inserts the ovipositor, remaining in this position from 4 to 6 minutes. The bone-colored egg is found embedded parallel to the fibres. It is about 2 m. m. long by ¾ m. m. in thickness and slightly bent. The hole close to this is filled in with mucous matter intermixed with particles of fibre. Repeated observations show that these eggs hatch in six days. The newly hatched larva is at first transparent as the eggs of the latter production, the first being of a more opaque color as also the young larvae, with the head of a darker yellow color. We found that the young larva went out in the same direction as fibres about one-eighth of an inch deeper, having made a hole one inch long in from four to five hours. As the larva increases in size its power of boring becomes more rapid. A half grown specimen traversed a piece of cane six inches in length, from one end to the other, in three days.

It is difficult to ascertain the number of moults the larva go through, as far as can be made out it is six, becoming full grown in about seven weeks, more or less, according to condition of food plant; the transformation of the pupa takes two weeks, and another couple of weeks will elapse before the insect issues, taking in all about three months for transformation; and we can safely say that the life duration of a female beetle, under favorable conditions is from 10 to 12 months. During more than half this time she is engaged in reproducing the species.

NUMBER OF BROODS.

As we see, the time for transformation of the beetle requires almost three months, and this would give us nearly four broods annually, yet with the slightly lower temperature during the winter months it will take somewhat longer, and we can put it down as three broods. The number of eggs produced by a female borer will vary between four and six hundred, the half of which will be laid during the first two months. On dissecting specimens not over this age, from four to six well developed eggs are always found, becoming less gradually, showing only from two to four eggs in specimens over five months old. Fifty eggs can always be traced in the ovary of a recently born female, and correspondingly less as she becomes older.

REMEDIES.

The most effectual remedy in the Fiji Islands, and the only one employed has been hand picking under pieces of split cane laid out for bait, here the beetles congregate and can readily be picked up. With us, this mode of collecting has not been so successful, yet, nevertheless should be kept up since so many eggs are deposited within the same, producing larvae which invariably perish in the sticks on becoming dry. Whenever possible the same gang of laborers should be kept on in stripping, and this must be instructed to collect or destroy every borer met with under the leaves. At Lihue, twice, a gang was sent through the field most affected to cut out every infested plant, and by splitting, the larvae, pupae and images found within were collected; rather a laborious work, yet nevertheless effectual. We have seen stacks of these pieces, many unsplit and containing borers, as those at bottom which remain fresh for a long time, that should have been laid out for bait and examined every few days.

We can attribute the immunity of diseases on the sugar cane in these Islands *to* the immediate burning of trash after cutting. A great many borers are destroyed thus, yet a large part remains under ground within the root-stocks, which in all cases where the borer is prevalent, should as soon as possible be plowed up and burned, thus free the land entirely of any beetles, and with a careful selection of plant cane, the insects should become much less in numbers.

Within the last two years, between $8,000 and $9,000 have been spent in collecting the borer, and the result is indeed most satisfactory. It is admitted on various sides, and we ourselves can see, that the same is less at the Lihue plantation than for years past.

Rank and soft seed cane is still suffering most, it is so easy here to insert the eggs, especially in later stages when the plants fall down in all directions, those split or broken will almost invariably be lost, they are supplied with a large amount of eggs.

Long rattoon, it is claimed, is but little affected by borer,

it is less watered, produces a hard, short joined plant, and if infested by borer it will still go on growing, and not decay so readily as does the seed cane. We have seen, two years since, a piece of infested cane in which three-fourths had to be left in field on cutting; the same field today is planted in long rattoons, ready to be cut next month, and not a decaying stick can be observed.

Mr. Weber informs me that during planting, the water had to be retained from large plant cane for five to six weeks, the hot weather and sun during this time destroyed many of the larvae and beetles in the stripped plants, which in no way suffered during this operation. A most significant fact, parallel with plantations in dry localities where the cane borer is never of any consequence.

THE CANE BORER IN THE FIJI ISLANDS.

In 1892 we visited the Fiji Islands as an agent for the Department of Agriculture at Washington. At that time the *Sphenophorus obscurus* was very numerous upon the sugar cane, so much so that some of the experimental plots near the mill at Nausori were practically destroyed. The beetles here being found more numerous than anywhere else doubtless from the fact that many of them escaped from the train loads of cane continuously standing by the mill and settled down in the nearest fields.

At the request of the Colonial Sugar Company we looked into the matter with a view of getting rid of the beetles the best way possible; all sorts of devices were employed and none worked better than pieces of split cane about 12 inches long, placed along the edges of the field and through the same at intervals of 12-18 feet, thus with seven little Indian girls, I collected over 16,000 beetles in some four hours, and the same little girls alone brought in the following noon over 26,000 beetles.

This method was kept up, and followed on all the plantations for the next three years, or until no more of the borers could be found. Tons of the same were brought in at the Nausori mill alone, and the expenses of collecting were practically nothing compared to the cost at Lihue, where such work has to be done by the day laborers. About four cents per pint of the insects was paid to the children. The result has been highly satisfactory, for, ever since the last five years, the cane borer has not been a pest in those Islands.

On my visit in November of the last year, together with Mr. Compere, we sat for hours at the cane-carrier, to pick out infested pieces of cane, in hopes of some clue to a parasite without any result, the infested plants were very rare and less than a half per cent contained traces of borer, whilst in 1892 some 18½ per cent of the plants coming to the mill were injured by them.

The only cane grown on the Rewa river are the Rose Bamboo and Malabar. The latter is preferred on account of its

strong handsome upright growth and practical immunity from borer. All other varieties, even our own celebrated Lahaina, were given up as not remunerative. In the moist climate at the Rewa river, at least, there, as the manager of Nausori informed me, the best result ever obtained had been with the Malabar cane, producing 56 tons to an acre, which in return gave 6 tons of sugar. Contrary to the reported disappearance of the beetles in cane fields, we found them still numerous in an experimental plot of some 130 varieties of cane, a great part of which had been entirely destroyed. The beetles were present in all stages in large numbers.

Throughout the places visited on Vitu Levu and Ovalao, the small patches of cane grown by natives showed always numerous borers. It is but a question of time and how long will be of interest, until the borer makes its appearance again in the cane fields in force, yet with such easily available and cheap labor as can be had, the danger can readily be prevented.

THE CANE BORER UPON OTHER PLANTS IN FIJI.

In 1892 the extensive banana plantations in the Fiji Islands were well nigh exterminated by a disease similar in appearance to the sereh on sugar cane, instead of the ordinary plants; these would grow up to a height of from two to four feet only, and stop at this with a stunted and bushy appearance. Even at this date the malady has not disappeared, and only a certain percentage of the plants come to maturity and bear fruit.

During 1892 we found the *Sphenophorus* beetle in large numbers, living in the tops of the healthy plants, causing these to decay before maturity, and no doubt having a large, if not the entire, share on the prevalent disease.

The root-stocks, as well, were infested with the borer in all its stages. The wild bananas in forests were similarly affected, and there, as well, were dying out. The beetles were still numerous upon the banana plants on my last visit, and were also found breeding in dead trunks of papaia.

OMIODES ACCEPTA, Butl.

The larvae of this *Pyralid* moth resembling that living upon various palms, is found quite numerous on higher elevations upon sugar cane at Kona, Hawaii. The ends of the leaves are spun together for several inches in length; between this the larva lives and eats the leaves from the outside. If living amongst the tender leaves on top of plant the damage done is more serious, yet not detrimental to the growth of plant. The young folded leaves were sometimes found to be eaten out in various parts, very much so if several larvae should live together, yet the cane itself is never attacked.

The insect is endemic and must have sufficient parasites to keep it in check, some of the introduced species, we know will also prey upon its larva and chrysalis. A similar larva formerly so numerous upon the sugar cane at Lihue, Kauai, has entirely disappeared.

Chilo saccharalis, so often reported as doing damage on sugar cane and corn in the United States, in Mexico, the West Indies, Java, etc., has as yet never been observed on these Islands.

Respectfully,

A. KOEBELE,
Entomologist.

The Hawaiian Sugar Planters' Association.
Honolulu, Oct. 10, 1900.

REPORT OF COMMITTEE ON FORESTRY.

TO THE HAWAIIAN PLANTERS' ASSOCIATION.

GENTLEMEN:—There has been much said about forests in times past and many theories advanced, and there is considerable agitation of the subject now going on. One writer makes the following summary or demand in his communication, viz: "What we want especially to preserve is the forest of the rain belt. This is the most important to us. This belt used to extend much further down than it does now. In many places the forest rain belt is steadily disappearing owing to the depredations of cattle, horses and goats, both directly and indirectly and to these must be added the vandalism of man. In some places the rain belt has entirely disappeared, and where springs could be found there is now nothing but an arid waste, the heat from which repels the clouds ready to yield rain from their termid bosoms, where before the cool air of the forest attracted them and they poured down abundant moisture."

It would be quite a satisfaction to know how much of the above this writer put down from personal knowledge, how much from theory and whether his statements were intended to apply to all these islands or only to certain parts, and whether he had considered, when recommending "especially to preserve the forest of the rain belt," any thought of a further homestead settlement of these islands? We doubt it, as all know who have given the subject thought, that there is no land for further settling, where man can get a living by cultivating the soil, save it be in "the forest of the rain belt." He further tells us, "In some places the rain belt has entirely disappeared." Surely the land thus afflicted by want of rain could not be settled now, and it would have been cruel to have settled them at an earlier period had it been known as the writer referred, who seems to know, that as soon as he removed the forest, so he could build and cultivate, his farm would become "nothing but an arid waste." If the above writer is correct the calamity he means must follow all settlers in our present "forest rain belt" if it is ever settled; and outside of our present rain belt certainly no settlements can now be made with success. So we must face the question, viz: Shall we preserve our forests and thus stop the settling up of the country? or shall we go on with our settling and run the risk of the country becoming "an arid waste?" From past observation and experience we recommend the latter course. In this we feel justified from the following facts, and scores of

other facts not here referred to. All the plantations on Hawaii from Kohala to Hilo have been cut out of the "forest rain belt." These forests consisting of various kinds of trees, bushes, ferns and grass, have been cleared from the land, and the land has been plowed and otherwise cultivated for over twenty years and from present indications it is now far from an "arid waste." As its present year's yield will equal the best ever taken from the land and thousands of men and animals are sustained upon it. The plantations upon these lands are valued at millions of dollars and produce a creditable income upon those valuations.

Had this forest been permanently reserved in its wild state, its value would have been only cents where it is now dollars. No men or animals would have been allowed to trespass upon it. Now thousands fare sumptuously from its products, and its products are scattered over the world to bless the people of other lands, besides contributing its share to build up trade and commerce. Remember, this wealth was produced *after* the forest was removed.

How the forest lands bordering on the upper side of these cane lands, and on the same slope should become a barren waste, by having its forest removed any more than the cane land above referred to did by having its forest removed, is hard to explain. Declarations to that effect are made, but practical men do not believe all declarations to be facts.

The vandalisms of man have cleared these lands of their forests and now millions of wealth is yearly produced upon them. While they remained a forest they did not produce a penny. Thus far on these islands but little wealth has ever been produced by the forests; all the people live outside of them, and all its wealth is produced outside of them and this applies to all countries.

History informs us, the time was when the Atlantic side of the American continent was covered by a forest; then it took 1,000 acres of it to support one Indian. Now nearly all the large cities of the continent are built upon these lands, and millions of intelligent, happy people live upon them and are fed and clothed by its cultivation since removing the forests and seemingly they have no inclination of abandoning these lands on account of their unfruitfulness caused by removing the forest more than a hundred years ago, as since such removal the clouds have not refused to supply the soil with moisture, or the springs, rivers and lakes with water, because the "vandal" hand of man had cleared away the forest, as claimed by the above writer.

Again, it is urged that no horses, cattle, hogs, sheep nor man must be allowed to trespass within this reserved "forest rain belt." I hesitate not in believing and stating that if this forest reservation proposition and the stock restriction proposed should be enforced, it would force these islands almost to a standstill development, and financial suicide,—a calamity

much to be dreaded, as it is well known that it is the forest rain belt that is still open for settlement and from which our live stock derive much of their support, and their food is so deficient now we have to import horses, mules, beef, pork and mutton, because there is not enough food to produce them here, and if a large part of what they now have is taken from them by this "forest reserve" proposition, what then will be our condition? Who can answer?

We would suggest, instead of the reservation above proposed: 1st. That the settling of the forest land shall continue as at present as long as such lands are available.

2d. All rentors of forest land should be permitted to enter said forest and cut and destroy all fern and other useless trash and set *grass* in their places. And by concession to present rentors have the forest thickened up by setting and protecting valuable tree plants where forest trees are too much scattered now to be an acceptable forest. *At the same time set out some valuable grass.*

3d. New leases of pasture land where forests would grow but are not now growing rentors should be required to set so many acres of forest every year of some good quality of forest trees and *grass*, and protect them by fencing for three or four years, or until the trees get large enough to be beyond any danger of their being injured by stock, after which they could be utilized as a pasture. There are several kinds of rich grasses that grow in the shade, and also grow well on these islands.

Should this course be vigorously pursued, a few years only will be required for Hawaii to have more acres in forest than it has now, at the same time ample pasture, thus enabling Hawaii to produce an abundance of beef, pork and mutton, and stock for home use, which it cannot do now, not because it has not enough suitable land, but because so much of its land is incumbent with fern, bushes, weeds, and some almost useless grass. This is not denying the fact that almost all Hawaiian pastures have some rich grass in them which should be extended and could be extended upon the plan proposed. I venture it now requires 100 acres on an average of our present pastures to sustain 10 head of bullocks, and that one-third of that number of acres would be ample to keep them under the system above proposed. Thus increasing the value of our pastures and adding to our forest area.

This would seem to be the correct principle for man to act upon, and not depend upon nature to set our grass and forests any more than to plant our cotton, cane, corn or any other crops.

It is claimed that "forests encourage rainfall," which may be true; but it is yet doubted. Our opinion is, the rain makes the forest, not the forest the rain. As where soil and climate are suitable with ample rainfall, forests will grow. Where soil and climate are suitable, but no rain, forests will not

grow. This should be considered proof, that the rain encourages the forests, not the forests the rainfall.

JOHN M. HORNER.

[Owing to the absence of both Mr. Lidgate and Mr. Walton, who were in foreign lands, no report was received from either on the subject of Forestry.—Editor Planters' Monthly.]

HONOLULU, 13 October, 1900.

C. M. COOKE, ESQ.,
President Planters' Association.

DEAR SIR:—In connection with my engagement as consulting engineer I have during the past year and a half investigated the water resources of the islands very thoroughly and note with regret the destruction of many of the ancient forests, which is now taking place, and the apparent helplessness of the authorities in their inability to grapple with the problem, and protect the present sugar industry and preserve for the future inhabitants the valuable heritage with which nature has endowed them.

CONDITIONS IN HAWAII.—I spent the past six weeks in Hawaii, and was astonished at the mischief accomplished in the past twenty years in the Kohala and Hamakua districts. In Hamakua I rode six miles through a dead forest on the north slope of Mauna Kea. All the underbrush was destroyed, and the trees were nearly all dead, or decaying—due to the cattle. This belt of forest covered an altitude of from 2,000 to 5,000 feet, and in former times extended down the slope toward the sea.

In Kohala the same condition exists—the only forest remaining being that of the inaccessible portion covered by the steeper slopes of Kohala mountains. On the road from Hilo I saw numerous fires in the borders of the cultivated land next the mountain. The work of destruction was still going on and what between the plantations on one side and the cattle on the other, except some restraint is exercised in the destruction I have fears for the future of the island.

EFFECT ON CLIMATE.—The climatic conditions existing on those islands are extremely delicate, and differ entirely from those of the mainland. The main source of rain is the precipitation of the vapor laden clouds which rise from the ocean, and float over the country,—except the surface of the latter is in a fit condition no rain will fall.

The removal of the forest, which had a damp cool surface suitable for this purpose, and the substitution of the bare superheated denuded surface, create a condition very unfavorable for rainfall.

Nearly every citizen has observed the marked diminution in rainfall due to forest destruction, which in the past has ruined many portions of these islands, but no concerted action has

yet been taken to remedy the evil, as both the public and legislative authority seem to be ignorant of its magnitude.

PRIVATE ENTERPRISE.—In Kukuihaele I noticed a thrifty forest belt which had been fenced in on the mauka side of the plantation, but on the outside of the fence the cattle men have sway, and nothing but the stumps of dead trees are visible.

In Pahala the Hawaiian Agricultural Company have erected 40 miles of fencing to protect the forest, and have supplemented this action by killing all the cattle inside the enclosure.

I walked through this forest in August for a distance of six miles from an elevation of 5,500 feet to one of 2,000, and it was so thick and wet and dense that I had considerable effort to make my way. The rainfall on its upper line, measured for sixteen days, was over 20 inches, while in the denuded plains below the fall was only .03 of an inch on one day only.

In West Maui the Wailuku and Pioneer Mill Companies have shown commendable enterprise in fencing and protecting their mountain slopes, and it is a pity the property owners on other slopes do not also adopt a protective policy.

NEEDED LEGISLATION.—After the promised forester from the U. S. division of forestry has made an examination of all the conditions, it will be necessary for the local government to adopt a firm and progressive policy. It may be necessary to restrict the cattle pastures for many years to come, and in many places they will have to be removed altogether.

The leasing of all government land involving the destruction of forest, should be stopped, whether to plantations or spurious homesteaders, who do nothing but sell the wood to the plantations, and afterwards their denuded patches. In the United States the general government is taking the matter in hand, and is now protecting its public lands, and withdrawing same from settlement, and punishing offenders who either burn or otherwise injure the forest. In Germany most of the forests are controlled or owned by the government, which protects and disposes of them for the interests of all the people. In Sweden there are 18,000,000 acres of forest under government control, and last year, after spending $420,000 in managing same, the state income from this source was over $2,000,000, derived from sale of wood.

In this country the wood possesses no great marketable value, but the presence of the forest exercises a marked influence on the products of the plantations. The loss in production due to lack of rain in say two or three plantations alone would more than pay for the entire beef and mutton fattened in a year here.

The cane is the natural product of the country, providing occupation for the many, and contributing most of the taxes to sustain the government of the country, and its protection is paramount to any other industry, especially the cattle one.

I would, therefore, advocate the restriction of the cattle to

very small areas, where they cannot do more mischief, the protection of the existing forest, the replanting and protection of the destroyed forest mauka of the plantations, the planting of algeroba or other hardy trees on the present waste low land, and the united action of both plantation interests and the general government in a policy of forest protection.

Respectfully submitted,

M. M. O'SHAUGHNESSY,
Consulting Engineer.

REPORT ON MANUFACTURE.

HILO SUGAR COMPANY,
WAINAKU, Hilo, Oct. 11th, 1900.

C. BOLTE, ESQ., Secretary H. S. P. A., Honolulu.

DEAR SIR:—I am in receipt of your communication informing me that I was appointed a member of the Committee on Manufacture, and that a report was expected.

I have not had time to spare to prepare a report, and as this matter has been very fully written up in former years and as there is nothing new in the process of manufacture in my mill, any information I might be able to impart would be of very little value.

I would suggest the following topics be taken up and discussed, as I believe more information can be gained in that way, than from any formal report.

Maceration—Its profitable point in our modern mills.

Clarification—Old and new systems compared.

Extraction of sugars by the use of crystallizers.

Purity of final molasses.

Extraction of moisture from sugars by artificial means before sacking.

I remain, yours truly,

JOHN A. SCOTT.

SPRECKELSVILLE, Oct. 10th, 1900.

C. BOLTE, ESQ., Secretary H. S. P. A., Honolulu, Oahu.

SIR:—Mr. Andrew Moore, chairman of the Committee on Manufacture, writes me, that owing to labor conditions, fires in the cane, etc., he has not had any time to write a report for the annual meeting to be held on the 22nd inst., and asked me to write the report.

I beg to say that I, also, have had a "slight" touch of the same difficulties that Mr. Moore mentions, but, my principal reason for not writing the report is, because in my opinion these reports are misleading.

I claim that there is no uniform system, and it is impossible to form ideas and comparisons of the work done in the different sugar mills, owing to each chemist having his own theory and system of getting at results. One mill may be doing equally as good work as another, but the results, or rather the chemist's reports, show entirely different.

I think the only sure way of having reports that are anyway reasonably correct is to have a committee appointed of the leading sugar house chemists in the country and have them report a proper system to do the work in all sugar houses alike and then each manager insist that the work in his mill be done according to this agreement. Suppose a business house in Honolulu employs an auditor to go about among their various stores or plantations to audit their accounts, would they be satisfied to have a dozen or more systems to be reported on? I think not. They would want one system to accurately compare accounts of one place with the other. So should it be with reports on manufacture.

Until some uniform system is adopted the chemists can make one believe anything; they can prove any figure as to extraction, total losses, etc. If one reads the reports of some mills, they think that these people are doing much better work than their neighbors, but the cause of this, apparent, better work is all owing to the methods which are used in obtaining the results.

So, I refrain from writing any report whatever, until such time as we can all write on the same basis.

Yours very truly,

W. J. LOWRIE,
Manager Hawaiian Commercial & Sugar Company.

HAMAKUA, Hawaii, H. I., Oct. 4th, 1900.

C. BOLTE, ESQ., Secretary H. S. P. A., Honolulu.

DEAR SIR:—Your favor of September was received by me yesterday, in which reference is made to the report on manufacture to be presented at the meeting of the association, to be held on 22nd inst. in Honolulu.

I regret to say that on account of pressing plantation work during the latter half of this year, which still continues, I am unable to devote the time necessary to prepare a satisfactory report on the subject. I will forward a copy of this to each member of the committee, so that if any material has been prepared for this report, it may be forwarded to you.

Yours truly,

A. MOORE.

REPORT OF COMMITTEE ON LABOR-SAVING MACHINERY.

HONOLULU, T. H., October 18th, 1900.

TO THE TRUSTEES OF THE HAWAIIAN SUGAR PLANTERS' ASSOCIATION,
Honolulu.

SIRS:—Your committee appointed to investigate and report on the offer by the Association of a reward for the design of a machine for cutting and loading cane, beg to make the following report:

We recommend that the proposed reward be divided in three parts.

1st. A reward of $2,000 for the best practicable *design* of a machine for cutting cane. The competitors would be required to submit detail and assembly drawings of the machine, with a full description of its action. The judges should have it in their discretion to decide whether or not the designs were sufficiently nearly practical to warrant their paying the whole or any part of the reward offered. They should also be authorized to accept special parts from various designs submitted to be incorporated by the judges in one final design; in which case the reward should be divided amongst the different competitors, parts of whose inventions are accepted.

2nd. A further reward of $3,000 for the successful working of the machine when built in accordance with the design accepted. The judges having selected the design, if a sufficiently satisfactory mechanism has been invented in the opinion of the judges to make it worth while to proceed, the association should manufacture the machine and test same, giving the inventor this further reward if the machine works sufficiently well to warrant a reward.

It should be the privilege of any inventor of a rejected design or otherwise to manufacture his machine (at his own expense) and exhibit its working in the field by the side of the machine constructed by the association in competition with said machine.

If this machine obtains first place the Hawaiian Sugar Planters' Association should pay such competitor, who had not previously received a reward, the sum of $5,000. In this case the machine should be purchased by the Hawaiian Sugar Planters' Association at its actual cost landed in Honolulu.

If a machine built by the association from parts of several designs secure first place, the reward of $3,000 additional should be divided at the discretion of the judges among the inventors of said designs.

The judges should be authorized to award a part of the prize for a machine if it showed a useful invention, even though no really practical cane-cutter were produced.

3rd. A reward of $1,500 for the best design of a cane transporter and loader into cars. We believe that a good deal of attention is now being given to such a machine, and think the reward therefore sufficient.

Discretion should be given to the judges to accept the whole or any part of a design, which should then become the property of the Association.

Any design or machine accepted by the Association by payment of a reward and cost of machine should become the property of the association as far as concerns manufacture in the Hawaiian Islands.

The trustees should endeavor to arrange that foreign ma-

chines be allowed landing to participate in the trials without paying duty.

We enclose a suggested advertisement.

Respectfully submitted,

F. M. SWANZY,
F. A. SCHAEFER,
Committee.

A REWARD OF TWO THOUSAND DOLLARS

is offered by the Hawaiian Sugar Planters' Association, for the best practical design of a machine for reaping sugar cane in plantation fields. The comparative merits and practicability of the design will be decided by a Board of Judges appointed by the association. The competition will close on the 30th day of June, 1901.

The best design so selected is to become the property of the association, who may, at the discretion of the judges, cause a machine to be manufactured in accordance with said design for actual trial.

A FURTHER REWARD OF FIVE THOUSAND DOLLARS

is offered for the best *machine* that shall actually reap cane in the field in a practical manner; this part of the competition to close on the 31st day of December, 1901.

The design accepted by the association in accordance with the first part of this advertisement will participate in the actual trials for the best practical cane-reaping machine (whether manufactured by the association or by the inventor) on behalf of the original inventor.

But should the machine built in accordance with the design accepted by the judges in the first part of the competition, secure the first place in the actual trials, the inventor will receive an additional $3,000 reward, or a total of $5,000 on both parts of the competition.

In case a machine not manufactured by the Association win the competition, the Hawaiian Sugar Planters' Association will purchase the machine from the inventor at the cost price delivered in Honolulu.

A FURTHER REWARD OF FIFTEEN HUNDRED DOLLARS

is offered for the best design of an apparatus to transport cane to and load it in railway cars. Competition for said design will close on the 30th day of June, 1901.

Competitors will be required to submit detail and assembly drawings of their designs, with a full description of the action and parts of the proposed machine; where only the *design* is called for.

In the second part of the competition where a *machine* is called for, competitors will be required to furnish a machine to be experimented with in the field by the Board of Judges.

The judges may, at their own discretion, accept any design or machine in part or in whole, and may decide which design

or machine takes first place, and whether any is sufficiently practical to merit a reward or part thereof.

Should the Hawaiian Sugar Planters' Association accept a design or machine, the payment of the reward advertised above shall be deemed to purchase for the Hawaiian Sugar Planters' Association all patent rights to such design or machine in the Hawaiian Islands.

All communications to be addressed to the Secretary, Hawaiian S. P. Association, Honolulu.

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FORESTS AND THEIR INFLUENCE.

By Prof. J. G. H. Lampadius, University of Southern California.

The influence of the forest on the climatic conditions of a country and its power to draw moisture from above and below is a subject that has attracted widespread attention. The preservation of the forest is as necessary to a high state of civilization as the well cultivated farm and no one is more dependent upon its products and influence than the farmer, in fact, to him it should be of equal importance to see the forest as well taken care of and in as high a state of cultivation as his farm, because wooded areas are most essential in producing the atmospheric conditions which will insure the tiller of the soil reward for his labor. Therefore, in the economic household of the State forest culture should be the most important branch of agriculture and is more or less vitally connected with every industry which adds to the wealth of the States and the comfort of its people. The carelessness with which we have regarded this resource and through which we have permitted the despoilation of our mountain sides of their moisture preserving shade is rapidly beginning to tell on the resources depending upon the preservation of the forest.

The cutting down, or burning of great areas of forest, permitting thereby the air and sun and wind to reach the soil, must of necessity cause a rapid evaporation and will result often by the therewith connected cooling process in those high winds, which have been so disastrous to our fruit interests and which help, by sweeping over the open and unprotected country, to rapidly diminish the moisture contained in the soil of the valley, and a country denuded of its forests may become so dry as to make the raising of grain prohibitive in spite of the fact that the amount of annual rainfall has remained nearly the same. This is now the case in most of the countries in inner Asia, such as Persia and Syria, which formerly, before the mountains were denuded, supported a teeming population and raised armies of millions of men, and also on our own continent in Arizona, for instance, where we find evidences of the existence of great cities miles in circumference.

Throughout the valleys of the interior east of us, especially the Mohave desert and like localities, all through what has

been called the arid belt, are evidences of great water courses, but as there is no large area of forest with that sponge-like leaf mold which retains the moisture and partly allows it by slow percolation to reach the reservoirs below, which again spend their surplus by way of springs at a lower level, partly feeds plant life and keeps the atmosphere moist through evaporation, the rain, coming down in sheets, will flow off quickly and form those roaring torrents which carry away with them the last vestige of good soil and finally leave the country a barren, windswept and sand-beaten desert. But even where conditions like those do not exist, the destruction of the forests has everywhere in the world, new and old, done great damage aside from the change in climatic conditions. Almost all the navigable streams show a marked decrease in the volume of water which passes a given point and an increase in the occurrence of destroying floods. To take in our own country the Sacramento river for an example, we find that this stream now is navigable only in the rainy season as far as Sacramento, while before the year 1850 we are told ships of moderate draft had no difficulty to ascend as far as Marysville the year round. A great deal of damage done by floods of that river is laid at the door of hydraulic mining and, I think, a great deal unjustly. It is at least certain that the wanton denudation of the Sierras has had as much to do with the devastating floods as hydraulic mining and is entirely responsible for the river's low water-mark in summer time, just as the water supply of all streams is diminishing at an alarming rate, wherever its source, the forest, has been destroyed. In the old country, where like conditions are existing, very costly efforts are now being made to remedy the evil.

The damage done by the loss of forest growth will nowhere be felt quicker than in Southern California. With our limited amount of annual rainfall and steep mountains, a self reproduction of the forest is very doubtful and, where it has been totally destroyed by fire, next to impossible. An area burnt over by one of our fierce mountain fires is despoiled of all vegetable matter, because, everything being so dry, the fire not only destroys all plant growth, but consumes, too, all seed and vegetable mould, which covers the ground, and bakes the soil and kills it. The first rainstorm of the season then washes all the lighter part of ashes, debris and soil down the mountain sides and, in the rapid movement of the water over it, the now bare soil is unable to absorb it and with each successive rain more of the fertile soil is removed and finally the hillsides are left totally barren and incapable to regain any forest growth.

The rainfall of a country must almost of necessity decrease under such conditions and certainly be of less benefit, and to speak of the torrential floods, which are caused by the water's rapid descent from the bare mountain sides and of which the large stones, over which all our streams enter the valley below, tell a tale. It is also certain that frosts will be of more frequent occurrence under those conditions and the difference

between day and night temperature be greater as a result of the more rapid rotation of heat, which in turn causes again the quicker motion of the atmosphere. After the common laws of heat, the dryer the atmosphere the more rapid is the rotation of heat and the cooler the atmosphere, the dryer it will be. An atmosphere saturated with vapor will check radiation with seventy times the power of a dry atmosphere. These facts are the cause why killing frosts occur far more rarely in wet than in dry winters. Now, if we have a dry, consequently cool mountain atmosphere and a naturally warmer atmosphere in the valley, the radiation will be very rapid and result in frost at the lowest point. Should, however, the mountain atmosphere be well saturated with moisture as a result from being well forested, because a tree will exhale in moisture more than its own weight within 40 hours, than the radiation of heat will be checked or frost not occur. From the same causes moisture is quicker condensed over a wooded than over a bare region. Extended observations in Europe have proven that there is a larger amount of rainfall over the forest than over the adjoining open country, because evaporation and its cooling influence is naturally greater over a forest than over an open field, and rain is therefore attracted by wooded regions. For the same reasons, that is on account of evaporation, the temperature of the forest is lower at daytime and higher at night time than in the open field.

Finally the forest acts as a shield against and moderator of prevailing winds. It is well known that while the wind may sweep with great velocity over the tops of trees, it is comparatively quiet within the forest. Rows of trees planted in regular intervals will give the same protection and a space eleven times the height of the trees will be sheltered.

Summing up, we may consider the main effects of the forest as fourfold:

First. Preservation and economic distribution of the water supply by rainfall.

Second. Greater humidity of atmosphere resulting in lesser extremes of climate.

Third. A larger and more frequently and evenly distributed amount of rainfall.

Fourth. Diminished force of the prevailing winds.

No one can deny that we have paid too little attention to the great value of the forest and have allowed this source of wealth to be wantonly destroyed. We cannot undo the past, but we can stop the wrong and provide for the future by paying close attention to the needs of the country in that direction and by establishing through the government a thorough system of forestry, which provides for the proper management of our forest reserves and by seeing that the government performs its duty in preserving that what it rightfully has reserved as a public domain.—Cal. Cultivator.

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Two of the new seedling canes, developed in Trinidad, W. I., are proving to be very superior canes. They have been intro-

duced into Louisiana by Dr. Stubbs, who states: "In my opinion they are the most valuable canes that can be grown in Louisiana soil. They make what our agricultural experts call an ideal specimen. We have classified them as 'T 95' and 'T 74.' To the lay public, there is nothing exceedingly significant in those words 'T 74,' but to the sugar planter they will be nothing less than startling. This cane produces thirty-eight tons to the acre. The juice yields 16 per cent of sugar. If you will compare these figures with statistics of cane now grown, you will realize that this new cane will revolutionize the sugar industry in Louisiana. The old cane gives an acreage of thirty to thirty-five tons, with a 12 per cent yield in the juice.

"The new cane is a long-jointed green stalk, and of great vigor, as was shown by its withstanding the terriffic gale that swept over the city on September 9 and 10. It was the only cane on the experiment field not blown down. Next week we shall send some of the cane to the experiment stations in Cuba and the Hawaiian Islands."

Commenting on these new canes, which are justly attracting much attention, the Louisiana Planter says: "From the few experiments which have been made of the sugar producing qualities of seedling No. 74, there is reason to suppose that from 15 to 18 per cent more available sugar is contained in it than in our ribbon cane and if this remarkable increase holds good, we may expect to see the sugar producing qualities of our cane advance in the rapid and profitable manner which has been the case with the European beet. When we read the history of the improvements worked out in beet culture from the middle of the last century to the present day we feel encouraged to believe that there is a remarkable future in the matter of cane development and we should not desist from our attempts to improve what is normally a very much superior raw material. Twelve per cent of the weight of the beet root is now being extracted in sugar against 1½ per cent extracted by Margraff in the middle of the last century; and if this is possible with one sugar producing plant, why should it not be possible with another?"

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The grand army of veterans is marching into the beyond. The steps of the survivors of those four years of strife are faltering, and in another generation only here and there will be a lonely man, in the tremulous accents of great age, talk of the days of the misty past when millions of men were under arms in the blood-stained Southland. The muster roll of the Grand Army of the Republic is fast diminishing in length, and it can be calculated with almost mathematical certainty in how many years the Grand Army will be only a name, the posts all mustered out, and only a few loitering survivors left to wear in their coats the bronze button of this grand patriotic organization.—Detroit Free Press.